

CLAIMS

1. (Currently Amended) A method for packaging a device, comprising:
 - applying a sacrificial material to the device;
 - applying a layer of ~~non-metallic~~ structural material adjacent to the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material;
 - removing portions of the structural material to produce one or more apertures to expose at least a portion of the adjacent sacrificial material, the one or more apertures having a size and shape such that a removing material is able to pass through at least one of the one or more apertures but a protective material cannot pass through the one or more apertures;
 - removing the sacrificial material, wherein the housing of structural material with one or more apertures remains;
 - selecting the protective material to coordinate a viscosity of the protective material with the size and shape of the one or more apertures, wherein the protective material is selected to have a viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing;
 - depositing the protective material adjacent the housing of structural material, wherein, due at least in part to the viscosity of the protective material, the protective material overlaying overlays at least one of the one or more apertures in an amount sufficient to substantially close the overlaid one or more apertures without the protective material being deposited on the device or any substrate underlying the housing; and
 - curing the protective material.
2. (Previously Presented) The method of Claim 1, wherein the operation of depositing the protective material adjacent the housing of structural material overlaying at least one of the one or more apertures in an amount sufficient to substantially close the overlaid one or more apertures without the protective material being deposited on the device or any substrate underlying the housing, further comprises:
 - providing a gas atmosphere within the housing, wherein the pressure is greater than or equal to 1 Pascal (Pa); and
 - providing a temperature of less than 600° Celsius (C).

3. (Original) The method of Claim 2, wherein the sacrificial material has a higher etch rate than the structural material.

4. (Original) The method of Claim 3, wherein the sacrificial material comprises either a photoresist or a polyimide material.

5. (Previously Presented) The method of Claim 2, wherein the structural material is selected from a group of Silicon Dioxide (SiO_2) and Silicon Nitride (Si_3N_4).

6. (Previously Presented) The method of Claim 1, wherein the step of creating one or more apertures in the housing of structural material comprises use of sputter etching, plasma etching, or ion beam milling.

7. (Previously Presented) The method of Claim 2, wherein the step of removing the sacrificial layer comprises use of chemical etching.

8. (Original) The method of Claim 2, wherein the step of removing the sacrificial layer comprises use of either plasma ashing or plasma etching.

9. (Previously Presented) The method in Claim 2, wherein the step of depositing a protective material comprises wicking the protective material into at least one aperture of the one or more apertures of the housing.

10. (Previously Presented) The method of Claim 2, wherein the step of depositing the protective material comprises applying the protective material to at least a portion of the surface of the housing and allowing the protective material to flow into at least a portion of the one or more apertures in the housing.

11. (Previously Presented) The method of Claim 2, wherein the step of applying a layer of structural material comprises forming a structural layer having a thickness of between about 0.2 microns and about 20 microns.

12. (Original) The method of Claim 2, wherein the step of applying a sacrificial material comprises forming a sacrificial layer having a thickness of between about 0.2 microns and about 10 microns.

13-23. (Canceled)

24. (Currently Amended) A method for packaging a device having at least one movable region, comprising:

forming a ~~non-metallic~~ housing over the device, the housing having at least one aperture, the at least one aperture having a size and shape such that a removing material is able to pass through the at least one aperture but a protective material cannot pass through the at least one aperture during an application of the protective material to the housing, wherein forming of the housing with at least one aperture further comprises:

applying a sacrificial material to the device;

applying a layer of structural material adjacent the sacrificial material, the layer of structural material forming a housing adjacent to at least a portion of the sacrificial material;

creating the at least one aperture in the housing of structural material to expose at least a portion of the adjacent sacrificial material; and

removing the sacrificial layer, wherein the housing of structural material with at least one aperture remains;

selecting the protective material to coordinate a viscosity of the protective material with the size and shape of the at least one aperture, wherein the protective material is selected to have a viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing;

depositing the protective material adjacent at least a portion of the housing, wherein, due at least in part to the viscosity of the protective material, the protective material at least flows into the at least one aperture, sealing the at least one aperture in an amount sufficient to substantially close the at least one aperture without the protective material being deposited on the device or any substrate underlying the housing; and

curing the protective material.

25. (Canceled)

26. (Previously Presented) The method of Claim 24, wherein the sacrificial layer has a higher etch rate than the structural material.

27. (Original) The method of Claim 26, wherein the sacrificial material comprises either a photoresist or a polyimide material.

28. (Previously Presented) The method of Claim 24, wherein the structural layer is selected from a group of Silicon Dioxide (SiO_2) and Silicon Nitride (Si_3N_4).

29. (Previously Presented) The method of Claim 24, wherein the step of creating the at least one aperture in the housing of structural material is at least configured to use sputter etching, plasma etching, or ion beam milling.

30. (Previously Presented) The method of Claim 24, wherein the step of removing the sacrificial layer is at least configured to use chemical etching.

31. (Previously Presented) The method of Claim 24, wherein the step of removing the sacrificial layer is at least configured to use plasma ashing or plasma etching.

32. (Previously Presented) The method of Claim 24, wherein the step of applying a structural material comprises forming a structural layer between 0.2 microns and 20 microns thick.

33. (Previously Presented) The method of Claim 24, wherein the step of applying a sacrificial material comprises forming a sacrificial layer between 0.2 microns and 10 microns thick.

34-43. (Canceled)

44. (Currently Amended) A method for packaging a device having at least one movable region, comprising:

~~determining a shape and size for an aperture, such that a removing material is able to pass through the aperture but a protective material cannot pass through the aperture during an application of the protective material to the housing;~~

forming a ~~non-metallic~~ housing over the device, the housing having at least one aperture ~~with the determined size and shape~~, wherein forming the housing comprises:

applying a sacrificial material to the device;

applying a layer of structural material adjacent the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material;

creating the at least one aperture in the housing of structural material to expose at least a portion of the adjacent sacrificial material; and

removing the sacrificial layer, wherein the housing of structural material with at least one aperture remains;

determining a shape and size for the least one aperture, such that a removing material is able to pass through the at least one aperture but a protective material cannot pass through the at least one aperture during an application of the protective material to the housing;

selecting the protective material to coordinate a viscosity of the protective material with the size and shape of the at least one aperture, wherein the protective material is selected to have a viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing;

depositing the protective material adjacent at least a portion of the housing, wherein, due at least in part to the viscosity of the protective material, the protective material flows at least partially into the at least one aperture, sealing the at least one aperture, and the amount of the protective material is sufficient to substantially close the at least one aperture without the protective material being deposited on the device or any substrate underlying the housing; and curing the protective material.

45. (Canceled)

46. (Previously Presented) The method of Claim 44, wherein the sacrificial layer has a higher etch rate than the structural material.

47. (Original) The method of Claim 46, wherein the sacrificial material comprises either a photoresist or a polyimide material.

48. (Previously Presented) The method of Claim 44, wherein the structural layer is selected from a group of Silicon Dioxide (SiO_2) and Silicon Nitride (Si_3N_4).

49. (Previously Presented) The method of Claim 44, wherein the step of creating the at least one aperture is at least configured to use sputter etching, plasma etching, or ion beam milling.

50. (Previously Presented) The method of Claim 44, wherein the step of removing the sacrificial layer is at least configured to use chemical etching.

51. (Previously Presented) The method of Claim 44, wherein the step of removing the sacrificial layer is at least configured to use plasma ashing or plasma etching.

52. (Previously Presented) The method of Claim 44, wherein the step of applying a structural material comprises forming a structural layer between 0.2 microns and 20 microns thick.

53. (Previously Presented) The method of Claim 44, wherein the step of applying a sacrificial material comprises forming a sacrificial layer is between 0.2 microns and 10 microns thick.

54-63. (Canceled)

64. (Currently Amended) A method for packaging a device, comprising:
forming a ~~non-metallic~~ housing over the device, the housing having at least one aperture;
forming ~~[[the]]~~ a shape and size of the at least one aperture, such that a removing material is able to pass through the at least one aperture but a protective material cannot pass through the at least one aperture during an application of the protective material to the housing;
removing a sacrificial material from within the housing through the at least one aperture;
selecting the protective material to coordinate a viscosity of the protective material with the size and shape of the at least one aperture, wherein the protective material is selected to have a

viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing;

depositing the protective material adjacent to the housing in an amount sufficient to substantially close the at least one aperture without entering the housing sufficiently to interfere with operation of the device, wherein a gas atmosphere is provided at a first pressure greater than or equal to 1 Pascal (Pa) and a first temperature less than 600° Celsius (C), and wherein the first pressure and the first temperature are adjustable during the application of the protective material; and

curing the protective material.

65. (Canceled)

66. (Currently Amended) A method for packaging a device having at least one movable region, comprising:

forming a ~~non-metallic~~ housing over the device, the housing having at least one aperture;

forming ~~[[the]]~~ a shape and size of the at least one aperture, such that a removing material is able to pass through the at least one aperture but a protective material cannot pass through the at least one aperture during an application of the protective material to the housing;

removing a sacrificial material from within the housing through the at least one aperture;

selecting the protective material to coordinate a viscosity of the protective material with the size and shape of the at least one aperture, wherein the protective material is selected to have a viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing;

placing the protective material adjacent to at least a portion of the housing, forming a protective layer on the housing, wherein the protective material extends ~~from~~ at least partially into the at least one aperture in an amount sufficient to substantially close the at least one aperture without the protective material being deposited on the device or any substrate underlying the housing; and

allowing or causing the protective layer to harden.

67. (Canceled)

68. (Currently Amended) A method for packaging an electromechanical device, comprising:

- applying a sacrificial material to the electromechanical device;
- applying a layer of ~~non-metallie~~ structural material adjacent to the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material;
- creating one or more apertures in the housing of structural material to expose at least a portion of the adjacent sacrificial material, such that a removing material is able to pass through the one or more apertures but a protective material cannot pass through the one or more apertures during an application of the protective material to the housing;
- removing the sacrificial layer, wherein the housing of structural material with one or more apertures remains;
- selecting the protective material to coordinate a viscosity of the protective material with a size and shape of the one or more apertures, wherein the protective material is selected to have a viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing;
- depositing the protective material adjacent the housing of structural material overlaying at least one of the one or more apertures of the housing in an amount sufficient to substantially close the one or more apertures without the protective material being deposited on the device or any substrate underlying the housing; and
- curing the protective material.

69. (Currently Amended) A method for packaging a device having at least one movable region, comprising:

- forming a ~~non-metallie~~ housing over the device, the housing having at least one aperture;
- forming [[the]] a shape and size of the at least one aperture, such that a removing material is able to pass through the at least one aperture but a protective material cannot pass through the at least one aperture during an application of the protective material to the housing;

removing a sacrificial material from within the housing through the at least one aperture;
selecting the protective material to coordinate a viscosity of the protective material with the size and shape of the at least one aperture, wherein the protective material is selected to have a viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing;

depositing the protective material adjacent at least a portion of the housing, wherein, due at least in part to the viscosity of the protective material, the protective material at least flows into the at least one aperture, sealing the at least one aperture in an amount sufficient to substantially close the at least one aperture without the protective material being deposited on the device or any substrate underlying the housing; and

curing the protective material.

70. (Currently Amended) A method for packaging a device, the method comprising:
forming a ~~non-metallic~~ housing over the device, the housing having at least one aperture;
forming ~~[[the]]~~ a shape and size of the at least one aperture, such that a removing material is able to pass through the at least one aperture but a protective material having a first viscosity cannot flow through the at least one aperture and be deposited on the device or any substrate underlying the housing during an application of the protective material to the housing;

selecting the protective material to coordinate the first viscosity of the protective material with the size and shape of the at least one aperture, wherein the protective material is selected to have a viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing; and

removing a sacrificial material from within the housing through the at least one aperture.

71. (Canceled)

72. (Previously Presented) The method of Claim 70 wherein the step of removing a sacrificial material comprises at least one selected from the list consisting of:

sputter etching, ion beam milling, chemical etching, plasma ashing, and plasma etching.

73. (Previously Presented) The method of Claim 70 further comprising:
depositing the protective material adjacent to the housing.

74. (Previously Presented) The method of Claim 73 further comprising:
wherein the operation of depositing the protective material adjacent to the housing further comprises providing a gas atmosphere about the device within the housing, wherein the pressure is greater than or equal to 1 Pascal (Pa); and
providing a temperature about the device of less than 600° Celsius (C).

75. (Previously Presented) The method of Claim 70 further comprising:
depositing a layer of structural material about the device, wherein the structural material has a lower etch rate than the sacrificial material.

76. (Previously Presented) The method of Claim 70 further comprising:
depositing a layer of sacrificial material about the device, wherein the sacrificial material comprises at least one selected from the list consisting of:
a photoresist and a polyimide material.

77. (Previously Presented) The method of Claim 70 further comprising:
depositing a layer of conductive material.

78. (Previously Presented) The method of Claim 77 wherein the step of depositing a layer of conductive material comprises depositing a protective material adjacent to the housing.

79. (Currently Amended) The method of Claim 70 wherein the step of forming the shape and size of the at least one aperture comprises determining a shape and size for the at least one aperture such that a surface tension of the removing material enables the removing material to pass through at the at least one ~~of the one or more~~ apertures but a surface tension of the ~~covering~~ protective material prevents the ~~covering~~ protective material from passing through the at least one ~~one or more~~ apertures.

80. (Canceled)

81. (Previously Presented) The method of Claim 1, further comprising depositing additional material adjacent to the protective material.

82. (Canceled)

83. (Currently Amended) The method of Claim ~~[[82]]~~ 81, wherein the additional material increases hermeticity of the housing.

84. (Previously Presented) The method of Claim 2, wherein the gas atmosphere comprises a gas selected from the group consisting of argon, nitrogen, helium, neon, sulfur hexafluoride, and air.

85. (Previously Presented) The method of Claim 2, wherein the gas atmosphere comprises a gas having relative humidity below 5%.

86. (Previously Presented) The method of Claim 85, wherein the gas comprises air.

87. (Previously Presented) The method of Claim 1, further comprising adjusting a first viscosity of the protective material to a second viscosity so that the protective material does not deposit on the device or any substrate.

88. (New) A method for packaging a device, comprising:

- applying a sacrificial organic material to the device;
- applying a layer of structural material adjacent to the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material;
- removing portions of the structural material to produce one or more apertures to expose at least a portion of the adjacent sacrificial material, the one or more apertures having a size and shape such that a removing material is able to pass through at least one of the one or more apertures but a protective material cannot pass through the one or more apertures;
- removing the sacrificial material, wherein the housing of structural material with one or more apertures remains;
- selecting the protective material to coordinate a viscosity of the protective material with the size and shape of the one or more apertures, wherein the protective material is selected to have a viscosity for preventing the protective material from being deposited on the device or any substrate underlying the housing;
- providing a gas atmosphere within the housing, wherein the pressure is greater than or equal to 1 Pascal (Pa), wherein the gas atmosphere comprises a gas selected from the group consisting of argon, nitrogen, helium, neon, sulfur hexafluoride, and air;
- providing a temperature of less than 600° Celsius (C);
- depositing the protective material adjacent the housing of structural material, wherein, due at least in part to the viscosity of the protective material, the protective material overlays at least one of the one or more apertures in an amount sufficient to substantially close the overlaid one or more apertures without the protective material being deposited on the device or any substrate underlying the housing;
- curing the protective material; and
- depositing additional material adjacent to the protective material, wherein the additional material increases hermeticity of the housing.